



DR. CARL LINVILL

Director Integrated Energy Analysis & Planning Division

ACADEMIC BACKGROUND

Doctorate, Economics (Ph.D.), University of North Carolina, Chapel Hill, 1993
B.A., Mathematics and Economics, University of California, Davis, 1984

PROFESSIONAL EXPERIENCE

Carl Linvill directs Aspen's Integrated Energy Analysis & Planning which conducts integrated systems analyses of energy, climate and natural resource issues in California and the Western Electricity Interconnection. Dr. Linvill's current assignments with Aspen include serving as a Director for Western Grid Group bringing independent regulatory and technical expertise to Western Interconnection Planning activities, serving as the Technical Lead on the Western Clean Energy Vision project providing a 2050 vision to support NGO participation in the Western Electric Coordinating Council's (WECC) Regional Transmission Expansion Planning (RTEP), serving as the Project Manager for the consulting team on the Long Term Procurement Plan (LTPP) project at the California Public Utilities Commission (CPUC), supporting the California Energy Commission (CEC) in evaluating its Energy Efficiency and Demand Forecasting methodologies and serving on Majority Leader Reid's Blue Ribbon Commission on Energy Policy. Dr. Linvill also served as co-coordinator of the Renewable Energy Transmission Initiative (RETI) for the Energy Commission in 2010 and led the Demand Modeling Methodology Evaluation project for the CEC in 2010. Dr. Linvill has previously dealt with issues of climate and electricity policy as a Public Utility Commissioner in Nevada, as Energy Advisor to the Governor, as Director of the Nevada State Office of Energy, as the Western Interconnection representative to the North American Electric Reliability Corporation (NERC), and as a member of the Western Interstate Energy Board of the Western Governors Association.

Aspen Environmental Group

November 2006 to present

Dr. Linvill is Director of Integrated Energy Analysis & Planning at Aspen with research, project management, quality assurance and business development responsibilities involving long term energy policy analysis, conventional and renewable energy supply alternatives planning and evaluation, and energy efficiency and demand response planning and evaluation. He has provided energy and economics expertise to the following clients:

California Energy Commission. Dr. Linvill is **Program Manager** for the Aspen Electricity Supply Analysis Division (ESAD) Technical Services Contract and **Deputy Program Manager** for the Aspen Siting and Planning Technical Services Contract where he supports staff and sub-contractors in producing electricity and natural gas planning analysis studies. He is an active participant in long term resource evaluation projects including direct contributions to the Demand Forecast Assessment, the Demand Forecast Energy Efficiency Assessment, the Scenarios Project and technical program management support for numerous electricity and natural gas projects executed to support the

2007 Integrated Energy Policy Report (IEPR). Dr. Linvill's primary work with the CEC includes the following:

- **Co-Coordinator, Renewable Energy Transmission Initiative.** Dr. Linvill assumed the position of co-coordinator of RETI replacing Dave Olsen in February 2010. RETI is the primary stakeholder venue in California to coordinate stakeholder evaluation of transmission development for Renewable Energy development to meet California's Renewable Energy and Climate goals.
- **Project Manager & Technical Lead for Modeling Methodologies Evaluation for the Demand Forecast.** Dr. Linvill managed a survey and evaluation of the demand forecasts produced by the Energy Commission and the uses of the demand forecasts by internal and external stakeholders. Recent work associated with the Demand Analysis Office includes evaluating the amount of energy efficiency embedded in forecasts, evaluating publicly owned utility energy efficiency forecasts, evaluating the status of the data available to support forecasting at the CEC and contrasting econometric, end-use and hybrid forecasting methodologies.
- **Quality Assurance for Demand Analysis and Energy Efficiency Technical Projects.** Dr. Linvill served as the project manager responsible for quality assurance and quality control for technical projects conducted by Aspen subcontractors regarding Publicly Owned Utility Energy Efficiency Program Evaluation (KEMA), Quantification of Utility Energy Efficiency Programs Impact on the Demand Forecast (Itron) and the Demand Analysis Working Group (Chris Ann Dickerson).
- **Project Manager & Technical Lead for the Scenarios Project Lessons Learned Report.** Dr. Linvill served as a member of the Scenario Project team under the direction of Dr. Michael Jaske. His responsibilities as a member of the team included evaluating data and modeling assumptions, assisting in evaluating modeling results, and identifying the limitations of project results given limiting data and modeling assumptions. His contributions primarily contributed to the structure, content and conclusions of Chapter 9 of the Scenario Report. Dr. Linvill prepared a Lessons Learned report at the conclusion of the Scenario Project to assist the Energy Commission in designing future work plans.
- **Support for Robust Decision Making and Exploratory Modeling.** Dr. Linvill received a contract with the Energy Commission to evaluate and recommend modeling techniques that support robust decision making in an environment of risk and deep uncertainties.
- **Program Management Support.** Dr. Linvill provided program management support and quality assurance services for numerous California Energy Commission planning contracts including contracts addressing resource planning and portfolio analysis, energy portfolio risk and uncertainty evaluation, renewable energy, energy efficiency and demand response characterization and evaluation, and energy portfolio reliability, environmental and climate performance assessment.

California Public Utilities Commission. Dr. Linvill is Project Manager for the Long Term Procurement Plan (LTPP) contract with the CPUC and he started work on this contract in June 2008. Dr. Linvill is a co-author of the Consultant Straw Proposal on LTPP Guidelines that was released in August, 2009 and the Consultant Report Appendix reviewing resource planning assumptions and methodologies for all western utilities. Dr. Linvill coordinated Aspen's environmental and barrier analysis for the CPUC Staff report to the Legislature released in August 2009 on 33% RPS Implementation Issues. Dr. Linvill assisted with presentations at public stakeholder sessions between August 2008 and April 2009, including the January 15 2009 presentation that unveiled the 33% RPS Implementation Timelines that have become a centerpiece of the Staff Legislative Report.

Energy Foundation

- **Western Grid Group 2050 Clean Energy Vision and Renewable Energy Transmission Plan Evaluation** Dr. Linvill is serving as a technical lead in support of NGO stakeholder participation in the RTEP process underway at the WECC. This support includes development of a 2050 Clean Energy Vision for the west as support for NGO participation in western states and at the WECC. The Clean Energy Vision is being prepared in collaboration with a large group of western environmental, renewable energy, energy efficiency and transmission development stakeholders.
- **Nevada and WECC Transmission Planning Support** Dr. Linvill has provided technical assistance in Nevada and the west on issues ranging from facilitating collaboration among utilities, independent developers and advocates, evaluating state, regional and federal policies that inhibit or facilitate efficient exchange among western states and evaluating renewable energy resource zones in Nevada, evaluating the viability of transmission alternatives, evaluating the demand for renewable resources, evaluating the effect of energy efficiency and demand side programs on the demand for renewable resources, evaluating the export potential for Nevada's renewable resources in the west and evaluating the effect of state and federal policy changes on the Nevada and regional demand for Nevada's resources.
- **Nevada Clean Energy Resource Alternatives.** Dr. Linvill received a contract with the Energy Foundation to assess the potential for renewable energy and energy efficiency alternatives to fill in the gap left by cancelled coal plants in Nevada. The project includes evaluating Nevada and western utility resource plans, characterizing renewable resource and energy efficiency potential and performance, and evaluating the infrastructure needs associated with more aggressive preferred resource alternatives. Dr. Linvill's analysis was presented in February 2008 in a report entitled, "Laying a Foundation for Nevada's Energy Future."

Nevada Office of the Attorney General, Bureau of Consumer Protection. Dr. Linvill is Project Manager of the Bureau of Consumer Protection (BCP) contract and he commenced work for the BCP as a consultant on energy efficiency, demand side management, renewable portfolio standard, critical facility designation and integrated resource planning issues in June 2007. He has provided testimony and/or litigation support for dockets including:

- Sierra Pacific Power Company d.b.a. NVEnergy for Approval of the 2011-2030 Integrated Resource Plan (Demand Side Plan) (10-07003)
- Nevada Power Company and Sierra Pacific Power Company d.b.a. NVEnergy for Approval of the 2010 - 2029 Integrated Resource Plan and the 8th Amendment to the Sierra Pacific 2007 Resource Plan (10-02009, 10-03023)
- Nevada Power Company and Sierra Pacific Power Company d.b.a. NVEnergy Applications for Approval 2010 - 2029 Integrated Resource Plan (Approval of the On-Line Project) and Revised Energy Supply plan (Revised Demand Forecasts) (09-07003, 09-09001)
- Nevada Power Company d.b.a. NVEnergy 12th Amendment to the 2007 Integrated Resource Plan to Adopt an Interim 2010 Demand Side Management Plan (09-08020)
- Nevada Power Company d.b.a. NVEnergy Application for Approval of a Revised Forecast and the On-Line Transmission Project (09-03005)
- Nevada Resource Planning Regulation Revisions (08-02037)
- Nevada Power Company Demand Side Management Plan Annual Update (08-08011)

- Nevada Power Company and Sierra Pacific Power Company Application for Approval of Renewable and Conventional Generation Facilities and a Status Report on the Ely Energy Center (Dockets 08-03034 and 08-03035)
- Nevada Power Company and Sierra Pacific Power Company Portfolio Energy Standard Annual Compliance Plan Report (Docket 07-04005).
- Rulemaking for Nevada Demand Side Management incentive regulation (Dockets 06-12005 & 07-06029).
- Demand Side Management plan evaluations (Dockets 07-06049 & 07-08016).

RAND Corporation. Dr. Linvill assisted the Rand Corporation in implementing an Energy Commission Exploratory Modeling Project in May 2008. The project evaluated the E3 GHG calculator, assisting Energy Commission Staff in constructing a scenario generator by adapting the E3 calculator to expand its capabilities and correct its over-simplifications, harnessing the scenario generator to Evolving Logic's exploratory modeling tool, and performing policy analysis using a the harnessed model and a stakeholder process to vet assumptions, formulate policy questions and provide policy insights using the modeling tool. Dr. Linvill's participation is focused on assisting with the stakeholder process and assisting with the formulation of clear policy questions and transparent modeling results.

Southern Nevada Water Authority. Dr. Linvill is currently assisting the Southern Nevada Water Authority (SNWA) with its evaluation of the economic and technical viability of solar development in eastern Nevada's desert valleys.

Office of the Governor of Nevada

2001-2003, 2006

As Director of Nevada State Office of Energy and Economic and Energy Advisor to the Governor, Dr. Linvill served as the Governor's advisor and his representative to the legislature in negotiating Nevada's 15 % Renewable Energy Portfolio Standard law in 2001. Dr. Linvill also played an integral role in updating Nevada's net metering standards, upgrading Nevada's Performance Contracting statutes, and implementing Nevada's LEED certification for commercial buildings program. Dr. Linvill created Nevada's first strategic plan for implementing its renewable energy and energy efficiency policies in 2002 and he wrote Nevada's 2003 Status of Energy Report to the Governor and Legislature. During his tenure, Dr. Linvill assisted in the development of about 2,000 megawatts of new high efficiency gas generation, more than 100 megawatts of renewable generation, and about 3,000 megawatts of new transmission import capacity. He also represented Nevada in numerous regional planning activities.

Public Utilities Commission of Nevada

2003 to 2006

Serving as Commissioner, Dr. Linvill addressed serious financial, infrastructure and planning issues during a period of unprecedented turbulence. He implemented significant policies regarding renewable energy procurement and demand side management program development, he helped to revise resource planning regulations to include incentive awards for renewable projects, he helped establish best practice risk management practices at the utilities, and he established best practice distributed generation interconnection rules and tariffs. Dr. Linvill was an active participant in the Western Conference of Public Service Commissioners and National Association of Regulatory Utility Commissioners

Previous Experience

1984 to 2001

Dr. Linvill was **Senior Economist and Acting Manager** of the Resource Analysis and Quality Assurance Division for the Public Utilities Commission prior to 2001. In that capacity he directed a PUC Staff resource planning case, and he provided expert testimony on market power studies, divesti-

ture proposals, curtailment and demand response tariffs, depreciation studies and certain deregulation regulations. From 1993 to 1998 he served as **Assistant Professor of Economics** at Sam Walton College of Business, University of Arkansas, where he taught undergraduate, MBA and doctoral courses in Managerial Economics, Microeconomic Theory, and Game Theory. His refereed professional publications are included below. He was nominated for the College of Business Teaching Excellence Award in 1996. Dr. Linvill worked for Pacific Gas & Electric Company from 1984 to 1987 as an **Associate Rates Analyst** prior to entering graduate school.

APPOINTMENTS AND MEMBERSHIPS

- Senate Majority Leader Harry Reid Blue Ribbon Commission on Energy Policy, 2008 to present
- Western Electricity Coordinating Council Scenario Planning Steering Group (SPSG), Energy Efficiency Technology Representative, pending board confirmation (May 2011)
- Bonneville Power Administration Non-wires Roundtable, 2011 to present
- Blue Ribbon Commission to Improve Southern Nevada's Fuel Supply, 2006
- Western Interstate Regional Advisory Board of the Western Governors Association, 2006
- Western Interstate Energy Board of the Western Governors Association, 2001-2003, 2006
- Western Interconnection Representative, Stakeholder Advisory Committee to the National Electricity Reliability Corporation, 2005-2006
- Founding Chair and Member, Nevada Southwest Renewable Energy Partnership, 2001-2004
- Board of Directors, University of Nevada – Reno, Mackay School of Mines, 2003-2004
- Member, National Association of Regulatory Utility Commissioners Electricity Committee, 2003-2006
- Member, National Association of State Energy Officials, 2001-2003
- Member, American Economic Association (AEA), 1993 to 2007

HONORS AND AWARDS

- Solar Champion Award, awarded by PV Now and the Solar Energy Industries Association, 2006
- Honorary Teaching Fellowship, University of North Carolina Economics Department, 1990-1991
- Superior Performance Award for Contributions to the Pacific Gas & Electric General Rate Case, 1987

SELECTED PUBLICATIONS/PRESENTATIONS

- Linvill, C., "Obtaining the Best Deal in Procurement from a Ratepayer Perspective," Law Seminars International, Las Vegas, Nevada, February 2011.
- Linvill, C., and R. McCann, "Earning Consent in Western Electricity Planning: An Approach to Least Regrets Modeling," Rutgers 23rd Annual Western Conference, Center for Research in Regulated Industries, Monterrey, California, June 2010.
- Linvill, C., and R. McCann, "Earning Consent in Western Electricity Planning: Exploratory Modeling and Stakeholder Process," Rutgers 22nd Annual Western Conference, Center for Research in Regulated Industries, Monterrey, California, June 2009.
- Linvill, C. et al (Aspen) and Olson, A., et al. (E3), "Survey of Utility Resource Planning and Procurement Practices for Application to Long Term Procurement Planning in California," Prepared for the CPUC Proceeding 08-02-007, April, 2009.
- Linvill, C., "The DSM Incentive in Nevada: Market Transformation and Rate Equity," Law Seminars International, Las Vegas, Nevada, February 2009.
- Linvill, C., R. McCann, S. Phinney and C. Cooke, "Laying a Foundation for Nevada's Energy Future," The Energy Foundation, February 2008.

- Linvill, C., “Building a Legacy Infrastructure Consensus,” Law Seminars International Energy in California, San Francisco, California, September 2007.
- Linvill, C., “RAND Exploratory Modeling Scouting Report,” Prepared for the California Energy Commission, Sacramento, California, May 2007.
- Linvill, C., “Shock Therapy: Tinkering with the World’s Most Complicated Machine,” Law Seminars International Energy in the Southwest, Santa Fe, New Mexico, July 2007.
- Linvill, C., E.Woychik, “Consumer Choice and More Complete Contracting: Removing the Barriers to Demand-Side Investment,” Rutgers 20th Annual Western Center for Research for Regulated Industries Conference, Monterey, CA, June 2007.
- Linvill, C., “Combined Heat and Power and the Optimal Portfolio for Nevada,” Combined Heat and Power Opportunities for Las Vegas Casinos, Las Vegas, Nevada September 2006.
- Linvill, C., Conference Moderator, “2006 Governor’s High Performance Building Summit,” Reno, Nevada, August 2006.
- Linvill, C., “It’s Time for Nevada Wind,” Nevada Wind Forum, Reno, Nevada, July 2006.
- Linvill, C., “Nevada State Policies Update,” Nevada Wind Forum, Reno, Nevada, July 2006.
- Linvill, C., “Capturing the Dynamics of Competitive Energy Markets and Portfolio Selection,” EUCI Resource and Supply Planning Conference, San Diego, CA, January 2006.
- Linvill, C., “The Changing Southwest Regulatory Landscape: A Regulator’s Perspective,” LSI Energy in the Southwest, Santa Fe, New Mexico July 2005.
- Linvill, C., “Resource Acquisition: A Regulator’s Perspective,” Law Seminars International, Las Vegas, Nevada, February 2005.
- Linvill, C., “The Status of Energy in Nevada: Report to Governor Guinn and the Legislature.” Nevada State Office of Energy. January, 2003.
- Granderson, G., Linvill, C., “Regulation Efficiency and Granger Causality.” *International Journal of Industrial Organization*, vol. 20 (2002) 1225-1245.
- Granderson, G., Linvill, C., “Parametric and Non-Parametric Methods for Benchmarking the Regulated Firm.” *Journal of Productivity Analysis*, vol. 12 (1999) 211-231.
- Granderson, G., Linvill, C., “Nonparametric Measurement of Productive Efficiency Change in the Presence of Regulation.” *European Journal of Operational Research*, vol. 110 (1998) 643-657.
- Ferrier, G., Klinedinst, M., Linvill, C., “Static and Dynamic Productivity among Yugoslav Enterprises: Components and Correlates.” *Journal of Comparative Economics*, vol. 26 (1998) 805-821.
- Granderson, G., Linvill, C., “The Impact of Regulation on Productivity Growth: An Application to the Transmission Sector of the Interstate Natural Gas Industry.” *Journal of Regulatory Economics*, vol. 10 (1996) 291-306.
- Ferrier, G., Ferrantino, M., Linvill, C., “Organizational Form and Efficiency: Evidence from Indian Sugar Manufacturing.” *Journal of Comparative Economics*, vol. 21 (1995) 29-53.